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ABSTRACT

The title reflects the first and major article in an issue of this newsletter devoted entirely to communication satellites. This series of articles on the potential and applications of communication satellites in development projects is concerned with their development for commercial and public service, development in the Pacific region, SPACECOM and third world telecommunications, a Canadian experience with applications for public service, satellite instructional television in Alaska, demonstrations in rural development, rural communications for social services in Peru, pitfalls of satellite projects, and space information stations. Other articles include a discussion of some general concerns in the production and use of films in development education and the role of video in development projects. (CMV)

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COMMUNICATION SATELLITES: EXPERIMENTAL & OPERATIONAL COMMERCIAL & PUBLIC SERVICE

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COMMUNICATION SATELLITES: EXPERIMENTAL & OPERATIONAL, COMMERCIAL & PUBLIC SERVICE

The 1970s have seen a tremendous upsurge in the use of commercial communications satellite systems for international and domestic communication. Before the 1970s only INTELSAT had operational communications satellites in geostationary orbit. The nine satellites of the INTELSAT I, II, and III series were of low capacity and had limited design lifetimes (1.5 years for INTELSAT I, 3 years for INTELSAT II, and 5 years for INTELSAT III). These satellites provide international communications exclusively.

Canada became the first country to establish a domestic communications satellite system using the geostationary orbit by launching ANIK A-1 in 1972. The United States launched its first commercial communications satellite in 1974, Western Union's WESTAR. The only other countries to date operating commercial communications satellites are the USSR and Indonesia, though India, Colombia, and other countries are actively planning to put domestic communications satellites in geostationary orbit.

In 1974, Algeria was the first country to lease capacity from INTELSAT for domestic operations. To date over a dozen countries are using leased INTELSAT capacity. Also, many plans for regionally owned satellite systems (including the Scandinavian NORDSAT, the

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SATELLITES IN DEVELOPMENT: THE PACIFIC EXAMPLE

institutions in the Pacific have for several years shared an audio channel on NASA's ATS-1 satellite. Now they face two new choices and tasks: they must determine their communication requirements and make the transition from experimental uses and demonstrations to operational services.

Other social-service users have faced similar transitions. In the U.S., Alaska has instituted commercial satellite service and the Appalachian Regional Commission plans transition for its ATS-6 educational satellite network. In Canada some experimental users of CTS will shift to the use of the hybrid Anik-B system. India plans an operational satellite including S-band capacity for continuing SITE-type educational TV.

The needs and institutional environments of the Pacific differ from those of North America and the Asian Subcontinent, but the paths to operational services cross in several places. The planning approaches here proposed for the Pacific may, in short, prove applicable elsewhere.

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SPACECOM — A NEW CONCEPT IN SATELLITE COMMUNICATION FOR THE THIRD WORLD

Several apparently contradictory observations led EUROSPACE to formulate the idea of SPACECOM — a concept that has started to provoke discussion. First, there was the conviction that the main new requirements for telecommunications and television from 1980 onward would arise from internal national planning in LDCs. Second, economic analyses of several existing or envisaged domestic systems show that in many cases satisfying domestic communication requirements by using a regional satellite system common to several countries is more effective than using a strictly national system — even though international cooperation would entail the time-consuming formation of an international decision-making organization any of whose members could unilaterally block action. Finally, their high capacity enables satellites to satisfy many communication requirements simultaneously, as INTELSAT V and the ESA H-SAT have done, even though the costs of such satellites are prohibitive for many LDCs on an individual basis. (For them, the attraction of high-power satellites is linked to the possibility of using small ground stations, which are relatively inexpensive and can thus be deployed in large numbers.) These three considerations have convinced EUROSPACE of the need for setting up an

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SATELLITE APPLICATIONS FOR PUBLIC SERVICES: CANADIAN EXPERIENCES WITH WORLDWIDE IMPLICATIONS

With the launch of Anik A-1 in 1972, Canada became the first western nation to establish a commercial domestic satellite system. Three satellites of the Anik-A series today provide thin route telephone, radio, and television services to the sparsely populated regions of the North, television program transmission to major network distribution centers, and heavy route telephone circuits between the east and west of the country.

Canada's developing domestic space industry also created the Communications Technology Satellite, Hermes, to test several new concepts in spacecraft design. Hermes has become the main vehicle used by various Canadian public service institutions to assess the application of satellite communications to their proper objectives. While to date the commercial and experimental satellite programs have developed along separate lines, Canada's Anik-B satellite program, which began in February 1979, was designed to allow and develop the transition from experimental to operational satellite systems.

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ARABSAT, and the Andean regional satellite systems) have been drawn up, though none is yet operational.

Like commercial satellite systems (which are being used for commercial telephone, radio, and television distribution), experimental satellites featured strongly in the 1970s. These satellites were built by national space R & D programs to test new frequencies, high on-board power levels, new stabilization techniques, and so forth. At this time it is not likely that many — if any — more of the experimental satellites will be built in the western world.

The passing generation of experimental satellites was used to test the application of satellite communications in health-care delivery, education, rural development, and other public service applications. With the era of experimental satellites drawing to an end, finding a place for these applications in the commercial satellite world will demand the integration of public service applications into the regular telecommunications environment, either through subsidization or through the dedication of new satellite systems to public service applications.

The 1970s have also seen abundant rhetoric, studies, and plans on how communication satellites could solve the information and communications needs of rural areas in Third World countries. For a number of reasons, however, the gap between what is possible and what is actually economically or politically within reach has not been bridged. First, many of the initial approaches focused on the use of communications satellites in individual sectors, primarily education, and making the required investment in hardware alone — for the space segment and ground stations — drained the budgets of the agencies involved. Clearly, it now seems, operating a satellite communication system should be a multi-sectoral undertaking, part of the overall telecommunications system of a given country. Only when hardware, operating, and maintenance costs are shared are they tolerable.

Also, investing in a domestically owned satellite (DOMSAT) is uneconomical for many countries because they cannot utilize the system's total capacity. To do so, most sectors would have to be ready to utilize the capacity. This, in turn, would require investing massive financial and human resources in software development, utilization planning, and the like. A phased approach, using international or regional systems initially, appears to be the most attractive solution, since it would enable countries to build up experience with satellite-based telecommunications and service-delivery systems gradually. It would also keep the initial investment costs down, since the cost of the satellite launch and for operational personnel can be shared. The decision to own and operate a DOMSAT system could come later and reflect considerable experience.

A second economic problem also stems from precedent. Early proponents of satellite systems advocated the use of direct television to every school, village square, or household, or the introduction of computer-assisted education in remote village schools. Although these proposals made economic sense at one level (cost-per-learner), the economic, institutional, and political tasks of making such proposals a reality are flanked by problems related to appropriate software production, effective utilization support, and the need to restructure the sectors to make the most of satellite-distributed programs. Also, satellite-based programs are only as effective as the available software and utilization components. Those skeptical of the effectiveness of educational communications are particularly vocal about satellites because satellites command so much attention and so many public resources.

Another factor contributing to the "applications gap" is the focus to date on the more technologically sophisticated applications for educational and rural development. The potential effectiveness of telephone systems or radio has not featured dominantly in the discussion on satellite applications for socioeconomic development. Yet, telephones and radios have great potential, as a "first step" at relatively low costs, even though experience with projects based on use of these media is limited. Last, the commercial satellite systems available at present do not feature technical characteristics that answer in a cost-effective way the needs of countries for low-volume rural communications.

A new generation of communications satellites will be required if the benefits of communications satellites for the rural populations are to be optimized. These satellites could be domestically owned, or shared regionally. However, the advent of new satellite technologies will not itself close the application gap. The planning and introduction of satellites has to be accompanied by program analysis and applications planning in sectors such as health care, education, and agriculture. Resources and time have to be allowed for developing ways to enhance coordination and cooperation. Above all, the development phase must be one in which identified communications needs and applications are linked to a nation's abilities to foot the bills, provide technical and service manpower, make institutional arrangements, and rely on its existing public service delivery systems. Such analyses may result in the promotion of a national rural telephone system that could be used effectively by the public service sectors or in the promotion of direct in-school television programs for the whole nation. However, decision-making without multi-sector analysis will probably lead straight to disappointment.

■ *Anne Cassy-Stellmer, Academy for Educational Development*

SATELLITE GLOSSARY

audio conferencing: linking several sites with the same frequency for interactive use

demand assignment multiple access (DAMA) capability: a method of assigning a channel to a user only when it is needed, so that channels may be shared by many users or sites

downlink: transmission from space to earth (and equipment to do this)

duplex circuit: a two-way channel

ground segment: the facilities on the ground, earth stations

long lines carrier: organization responsible for carrying long distance telephone traffic

simplex circuit: a one-way channel

space segment: the satellite

thin route: low density telephone service

transponder: satellite transmitters/receivers

uplink: transmission from earth to space (and equipment to do this)

A New Satellite Initiative

A new initiative by the United States is aimed at helping developing nations to use available satellites for development communications. U.S. Ambassador John E. Reinhardt at the UNESCO 20th General Conference in November of 1978 announced "a major effort to apply the benefits of advanced communications technology — specifically communications satellites — to economic and social needs in the rural areas of developing nations." He elaborated: "This program will . . . enable nations in the developing world to disseminate valuable information to people in remote areas. My Government — in cooperation with officials in developing areas — will work to design projects to promote basic literacy for children and adults, and to share information on basic health care and other subjects vital to rural development . . .

"We expect to learn much from this new project. But it is much more than a technological demonstration. It is a committed U.S. effort to build communication skills and experience which will enable developing countries to strengthen their own global, regional, and national communications systems. The programming will be managed by the recipient countries themselves, to help meet the basic human needs priorities which they identify. The project will be aimed at building permanent communication technology skills in these countries. At its conclusion, all aspects of management and control will be turned over to the recipient nations, and throughout all of this, we hope that the project will develop expertise that will be transferable to other parts of the world."

Pacific Example (continued)

Explorations of satellites' potential in the Pacific began in 1971, when NASA satellites became available to institutions serving Pacific people. For conferences on various issues, the PEACESAT network now links representatives of far-flung Pacific isles. Of particular interest is the University of the South Pacific's use of the ATS-1 to administer its extension program by linking scattered extension centers. The system makes possible administrative conferences among staff members, tutorials between students taking correspondence courses and professors teaching at the main campus in Suva, Fiji, and special conferences on regionally pertinent development issues. Other agencies occasionally using the USP network in the South Pacific include the World Health Organization, the International Labor Organization, and the South Pacific Commission.

Proven Potential and the Pacific Prospect

The ATS projects, particularly the audio-based projects on ATS-1, stand as proof that communication satellites can be used effectively in social-service delivery. Properly considered experimental, the projects opened the way for the satellite-using institutions to make good on their mandate to provide ongoing services, a challenge that now requires a timely and well-planned transition to a system including the features that were most valued during the demonstrations.

Here the Alaskan satellite experience sheds some light. Once ATS-1 had proved successful in health-care delivery in isolated regions, the U.S. Public Health Service increased its efforts to make reliable communications available to all Alaska's health-care providers. At the same time, public pressure to provide reliable statewide telephone service was building. Thus, the state legislature allocated $9 million to purchase 100 earth stations (later increased to 120), which were installed and maintained by the common carrier, RCA Alaska Communications, and now operate with the RCA SATCOM satellite.

In Alaska, the 4.5 meter C-band terminals in the villages provide both basic telephone service (through a village public telephone) and a medical communication channel. Taking advantage of the lessons from ATS-1, the Public Health Service specified a conference system with four frequencies allocated to provide links from villages to regional hospitals. Each village unit consists of a push-to-talk microphone and channel selector. The consultation system can be turned into a statewide information system simply by requesting all sites to select the same channel, while special training networks can be created by offering programs to target groups on a specified channel. A fifth channel is available for hospital-to-hospital communication only.

Of particular relevance is the general approach taken in Alaska. A transition was made from an experimental to an operational system through cooperation between the social-service institution (the Public Health Service), the state government, and the commercial carrier. This model of institutional cooperation should be considered in a broader context and for more widespread adoption.

The Institutional Environment

In the Pacific as in Alaska, telecommunication planners must work with three major institutional groups. One group is made up of the providers of international communications (e.g., INTELSAT, the international carriers, and, on an experimental basis, NASA). A second comprises the domestic telecommunications organizations (e.g., the post and telecommunications authorities of each country and other domestic carriers). The third group consists of the users, primarily institutional, both domestic and regional/international. Domestic users might include health ministries that need to communicate with decentralized health clinics and to coordinate emergency evacuations, and agriculture and fishing ministries that need to keep in contact with their field personnel. Private domestic users might include producers and suppliers who need to get goods to and from markets. Regional institutions — in the Pacific, most notably those institutions involved in the demonstrations — might include organizations charged with training, disaster relief, disease prevention and control, community development, and the like.

For many institutions, identifying their telecommunication requirements will not be easy. Those with experience using communications will have some grasp of the potential benefits of telecommunications for their activities, but they still may not know enough to specify the exact requirements or calculate the value of communication in terms of how much they would be willing to pay for communication services. Pilot projects, especially those using INTELSAT to link sites within a single nation or region, represent one means of gaining further experience.

INTELSAT has recently begun a study of user needs through 1988. Says INTELSAT Director General Santiago Astrain: "This study will examine not only an extension of the regular transponder leases, but other types of service capabilities, including higher EIRPs. These studies may show ways the INTELSAT could provide educational, health and other social services, and will examine the possibilities for such new services on either a shared satellite system or on separate systems designed to meet the particular needs of countries or even regions of the world."

Several nations and territories in the South Pacific now use INTELSAT for international communications, including Fiji, Nauru, New Caledonia, Tahiti, and Guam. Other Pacific island nations are likely to install INTELSAT Standard B stations in the next few years, following the example of Tonga in 1979. These INTELSAT stations provide reliable communications within the region and with the rest of the world. Investments already made or planned for these facilities can provide increased socioeconomic benefits if the channels are accessible to public service users. For example, the University of the South Pacific may require a block of evening time to link all extension centers in countries with INTELSAT earth stations. For this kind of application, a single simplex voice channel shared by all sites would be required. Demand-assignment techniques would allow the same frequency to be assigned to all sites. A "bulk use" or "off-peak" rate would make it attractive to social-service users to use spare capacity for this type of application.

The installation of satellite earth stations for reliable international communications may, however, leave some countries and territories with more reliable international than domestic communications. To serve the development needs of the Pacific, reliable telecommunications must be available to individuals and institutions within each country as well. Again, satellite technology, probably in conjunction with terrestrial radio links, may be the answer. However, even the INTELSAT B stations will be too large and expensive for domestic rural communications; small antennas similar to those in use in Alaska may be more appropriate. INTELSAT's offer to allow demonstrations of smaller earth stations may give Pacific nations the opportunity to explore this technology at minimum financial risk.

To make the transition to operational communication services that are suitable for public service as well as private use, the various institutions identified above must be brought together. The gap between the technical planners and the users will have to be bridged. User institutions will have to identify their communication requirements explicitly and estimate realistically how much they can pay for communication services. Telecommunication planners will have to explore technical options and take a creative approach to developing and implementing systems to meet the Pacific region's needs.

(Bibliographic references are available from the author.)

■ *Heather E. Hudson, Academy for Educational Development. This article is adapted, with permission, from a longer report published in* Pacific Telecommunications Conference Proceedings. *D.J. Wedemeyer and David L. Jones, eds., Institute of Electrical and Electronics Engineers, Honolulu, Hawaii, 1979.*

"Selected Bibliography on the Utilization of Satellites for Educational Purposes," (Document #424), can be obtained from UNESCO's Division of Structures, Content, Methods, and Techniques of Education, 7, Place de Fontenoy, 75007, Paris, France.

SPACECOM (continued)

effective organization capable of purchasing systems and leasing their capacity according to the needs of various countries. However, this decision makes other decisions necessary. For example, should a new organization be set up or should the "domestic" services provided at the moment by INTELSAT be used and developed? Can INTELSAT satisfy the future requirements and resolve the contradictions that have just been raised?

As a talking point, consider a hypothetical entity called SPACECOM, which could be independent of but complementary to INTELSAT and which exists to help countries identify, analyze, and resolve economically their already urgent and future telecommunication problems. What could such an entity provide to the countries of the Third World?

It will be assumed, on the basis of the points of view most often expressed by official national telecommunication bodies, that SPACECOM should be a non-conventional commercial company, controlled by these bodies but at the same time open to external investment. SPACECOM's contribution to the solution of Third World telecommunication and television problems, especially with respect to the development and operation of the space sector of the systems, could thus be summarized as follows:

- to group local financial capabilities and contribute external financial means (own share capital and loans);
- to enable a country to tailor its investment to its requirements and/or means;
- to form a corporate body and use the effective decision-making procedures employed by a commercial company, while at the same time eliminating the risk of unilateral decisions inherent in all purely domestic systems;
- to make fuller and more efficient use of the capacity of the space sector;
- to undertake secondary activities at the request of its shareholders (in the remote-sensing field, for example) and to provide by sale or lease parts of the ground sector of the telecommunication systems, or yet again to transfer technology to industry in Third World countries.

While limited at the moment to developing only the telecommunications space sector, an organization like SPACECOM can offer a genuine economic benefit both to its financiers and to its users. During 1978, EUROSPACE conducted a field survey in which questionnaires were circulated in more than 80 countries to 150 organizations (PTT and information bodies). At the same time, 31 countries representing 60 organizations were visited. Fifty-four significant replies were received, of which 51 contained expressions of interest in SPACECOM (that is, of an intention to participate in SPACECOM as an investor and/or user of its services).

The survey revealed a large potential market for 4/6 GHz and 11/14 GHz transponders. Taking into account potential competitive strengths and weaknesses in this market, it was estimated that, in telephony and TV distribution, the competition could capture about 50 percent of this market, but that SPACECOM could gain most of the direct TV market in the absence of any effective competition in this sector over the period under review. Unanimously, the officials interviewed expressed the desire for SPACECOM to comprise regional centers that would control the satellites serving the region.

Were SPACECOM to function as a commercial company, the means of raising capital at central or regional levels would pose something of a problem. However, all save three of the African officials contacted believed that Africa's requirements could be satisfied by satellites that also serve Europe. This set-up would place the African ministries in the position of users, rather than investors, initially.

In general, the organizations contacted expressed the wish to participate in making the investment, but have all realized the value, even the necessity, of accepting the flow of external funding into the organization's own funds. Agreement was also widespread on the value of separating utilization and investment. (Certain officials expressed the wish that the control rights of external investors be limited.)

All interviewed considered that the main objective of SPACECOM should be to make the space sector available for domestic telecommunication services (including television) by leasing repeaters. However, some suggested that a secondary type of business or interest could lease ground stations and train personnel. Others even proposed that SPACECOM provide remote-sensing services.

Unavoidably, SPACECOM will find itself in competition with other organizations of the same kind, such as INTER-SPUTNIK, or with national or regional projects such as PALAPA, ARABSAT, etc.... But market relationships could be complementary rather than competitive. In addition, the survey revealed INTELSAT's own constraints, in particular the limits of its ability to provide domestic systems and the rigidity of its decision-making procedures. It can be concluded from the replies of most of the telecommunication entities interviewed that a SPACECOM-type organization should be better placed than INTELSAT to provide, economically, new domestic services required by these entities (in particular, TV distribution and rural telephony).

In light of these considerations, EUROSPACE is now examining the ways and means of establishing a SPACECOM organization. Potential sources of investment are being approached, along with European and Third World authorities who will become involved, especially the PTTs and the TV organizations.

■ *Yves Demeriior, Secretary General, EUROSPACE, Paris*

APPLICATIONS (continued)

The Hermes experiments and Anik-B pilot projects have as their goal testing the role of telecommunications in general, and satellite communications more specifically, in overcoming the constraints to social and economic development that rural Canada shares with many LDCs.

- difficulty in attracting adequate specialists and managers to remote areas
- high cost and inefficient use of special staff who are required to pay routine visits to remote areas
- difficulty field personnel in remote areas have obtaining specialists' advice or consultation
- long delays in dealing with potential emergencies
- difficulty in providing in-service training programs for remote-area personnel
- feeling of isolation by remote-area personnel
- lack of culturally or regionally relevant broadcast programs or systems
- lack of possibilities for inter-community communications among community leaders or groups with similar concerns

The Hermes Experiments

The communications facilities used in the Hermes experiments range from regular telephone links, to teleconferencing, to slowscan TV, to facsimile, to data, to radio and television broadcasting, to one-way television links, as well as to interactive television.

Hermes was launched in January of 1976 and is scheduled to be turned off in late 1979. The Hermes experimental applications program in Canada was initiated when the Department of Communications (CDC) invited any interested groups in the country to propose experimental uses. The program is conducted with 20 satellite earth stations, which are loaned to the various experimenters. Since several projects are going on at the same time, no single experimenter has access to all terminals. The Hermes Project is a Joint U.S.-Canadian venture. Time is being shared on an alternating day basis, an arrangement that poses specific constraints on the experiments conducted in both countries. The experiments conducted in Canada last, on average, three months. Experimenters have in general between three and six satellite terminals at their disposal.

Education. Six education experiments have been conducted using Hermes. To create a multipurpose educational network, the University of Quebec (a decentralized province-wide institution with 7 main campuses) conducted 12 sub-experiments involving most of its campuses. The experiments explored novel ways (including teledocumentation and teleteaching) the institution could use telecommunications to fulfill its mandate to provide education and research opportunities to all residents of Quebec.

A second experiment focused on distance education. Just prior to its participation in the Hermes project, the Distance Education Planning Group (DEPG) was created by the Ministry of Education of British Columbia to assess and plan access to educational opportunities for residents in remote areas of the province. The main objective of DEPG's project was to test the utility of a centralized distance education agency in B.C. to coordinate activities on a consortium basis. Successful, DEPG managed to enlist the active participation of over 20 educational institutions and it demonstrated modes these institutions could use to cooperate in program development, software program sharing, local tutorial support, and so forth. While no credit courses were broadcast, the programs aired included vocational training courses in forestry, a series for senior citizens on current issues, a series of public health forums, and programs for librarians on term-paper clinics and on-line computer searching. The programming format was continually revised and included workshops, seminars, phone-ins from cable viewers, films, discussions, and off-air workshops.

Another representative experiment involved the Ontario Education Communications Authority (OECA), which provides educational radio and TV broadcasting for the province. It used the satellite system to bring some of its TV programs on a trial basis to communities. This outreach activity was supported by specially designed print materials, pre-broadcast workshops, visits, and tests of audio conferencing as a means of inciting learner participation in remote sites.

Health Care Delivery. A telehealth care experiment conducted by the University of Western Ontario connected the University Hospital, a remote hospital, and a nursing station by audio. (The remote hospital also sent television images to the University Hospital.) Vital signs were transmitted by special equipment, such as electronic stethoscope, ultra sound, and electrocardiogram in this experiment, which established the feasibility of supplying specialists' advice by telecommunications to the staff of remote health-care facilities.

Memorial University demonstrated the use of slow-scan TV to transmit x-rays from remote hospitals for specialist interpretation. In another experiment, the Government of Ontario simulated a medical emergency evacuation from a remote site to a regional hospital by continuously monitoring the heartbeat of the patient while he was in transit.

Administrative Communications. The Telecommunications Service Branch of the Government of Ontario, which has the responsibility of providing all telecommunications services for the various provincial ministries, tested the satellite system in teleconferencing (audio and video) modes and for data transmission. In a multi-ministry experiment, the Ministries of Environment, Natural Resources, Transportation, and Agriculture, as well as the Solicitor General, Civil Service Commission, and Ontario Educational Communications Authority designed programs to address agency priorities in serving remote and non-urban areas. Projects included support of forest fire control, routine conferencing, medical evacuations, consultations within government on policy directives, etc. In Quebec, the small terminal was deployed in remote exploration camps to provide instant communications for a geochemical research team.

Almost all other experiments had administrative communications components, either in support of matters bearing on experiment management or the services delivered. They included course scheduling, discussions with site coordinators regarding follow-up activities, and the transmission of patient charts.

Community Interaction. A two-way video experiment between a community in French-speaking Quebec and a small francophone community in the English-speaking province of Saskatchewan allowed the citizens in these communities to exchange programs on their respective cultures, activities, and interests. The Alberta Native Communications Society (ANCS), which provides TV and radio programs for Alberta's Indian populations, spearheaded an experiment in pooling the resources of agencies and ministries responsible for Indian affairs. The project consisted of an audio phase preceding a video phase. In both, the ANCS studio prepared programs in consultation with the people and coordinators in the receiving communities. In post-program discussions via the satellite among all sites, spokesmen for or against certain programs took the studio "hot seat" to discuss and explain program implications.

Broadcasting. Of the three broadcasting experiments, only one involves television activity. This experiment, jointly sponsored by the Canadian Broadcasting Corporation (CBC) and OECA, provides network television signals to very small antennas in remote areas. Technically, this experiment demonstrates the Hermes satellite's position as a forerunner of Direct Broadcast Satellite activities.

The other two broadcast projects, both sponsored by native communications groups in Northern Ontario and Northern Quebec, demonstrated new approaches to regional radio networking. In both, local community radio stations were linked via satellite to exchange programs and news, and to strengthen regional identity.

Findings

The Hermes experiments demonstrated that a high-powered satellite system can provide a reliable and flexible communications system and that this system can be used effectively by the public service sectors to support their work in remote and dispersed areas. The experiments established, among other things, that terminals can be operated easily by non-technical people with a minimum of training, that the audio system was more trouble-ridden than the video system, that the satellite delay did not affect the communications significantly, that open microphones are preferable in most cases to push-to-talk microphones, that satellite communications systems can be "demystified" and made acceptable to most participants, that audio conferencing can be an economical and useful tool for administration and training, and that satellite systems can be shared effectively by users with different program interests.

Lessons related to program preparation and operation are also numerous. First, a coordination committee should be set up to give the main groups of participants a say in program development, and participants at remote sites should be involved very early in project development. Second, coordinators for activities at all sites should be appointed early on in the project. Third, the program preparation team should include program managers, communications engineers, evaluators, and content specialists. Fourth, program planning should be flexible, especially with respect to administrative matters.

Operating experience revealed that the interactive component of the satellite system was considered most significant by the participants and that dry-runs are required to familiarize users with interactive on-air techniques for educational programs. Experience also suggests that no single educational format always works but that for outer-active systems, "talking heads" can be acceptable since participants at remote sites can interrupt.

In general, participants at remote sites reacted favorably when presentations were made by resource people at other remote sites, not exclusively by those at the main resource center. Almost all participants preferred short, discussion-stimulating messages to a long film or tape, and the importance of having a moderator/tutor in each participating group was firmly established.

Other findings were that the satellite-delivered component should be part of a multi-media approach to teaching, that programs should stimulate discussions between participating sites (and not only between sites and resources people), that even a well-prepared telecommunications session will spur less interaction between participants than will similar face-to-face sessions, and that the number of sites or participants that can meaningfully be linked in an educational teleconferencing network is finite.

The Hermes experiments established that within Canada satellite systems can be used with success to support health-care delivery, education, and so forth. They also showed that merely recognizing this fact is not enough to facilitate the adaptation of operational systems. But at the same time, they provided information and insights of use to policy-makers and program developers inside and outside Canada.

■ *Anne Casey-Stahmer, Academy for Educational Development*

Satellite ITV In Alaska

In Alaska, the distance between settlements, the sparsity of the population, and geographical obstacles have all hampered development of a reliable, statewide communication network. Of late, the conclusion has been reached repeatedly that satellite communication is the only effective way to surmount these natural barriers in Alaska and to equalize the quality of communications available to urban and rural Alaskans. The state also has a long-standing commitment to equalizing educational opportunities. Over one-third of the annual state budget is devoted to education to assure that regions with small populations (and with virtually no local tax base to support education) have public schools.

Four years ago, over 100 Alaskan communities, most with schools, had no reliable telephone service. In many villages CB or HF radios were the only contact with the outside world. Even in many communities with telephones, completing a call to Seattle was easier than contacting a village 30 miles away. Yet, in rural Alaska, a phone can literally mean life or death in an emergency. So, at the state's initiation, the number of long-distance circuits was increased, and rural service began to improve. State attention then turned to the other most visible means of communication still lacking in most rural communities: television. In 1974, most Alaskans could watch commercial or public TV, broadcast or cabled through local stations, in the largest communities. Geographically, however, most of the state was not served, and "live via satellite" programming was generally limited to special sporting events that could draw local advertising dollars.

In 1974-75, the state's participation in the educational applications of the ATS-6 satellite project helped define the significance of television to Alaska's rural schools. In organizational and management terms, the ATS-6 project was accountable to the communities it served, and it offered important opportunities to train Alaskans to make Alaskan television programs for rural viewing. "The old folks smile as they hear a language they can understand," wrote one villager.

For the most part, however, the instructional TV component of ATS-6 was not part of the mainstream of Alaskan education. The ATS-6 project was not managed by an educational agency, and it was an experiment that ended, a phenomenon common in Alaska. When ATS-6 broadcasts ceased in 1975, the teachers in the scattered site villages still needed to teach elementary health and English as a second language, and they continued to do so, minus the ATS-6 video and interactive audio.

Alaska was not prepared to carry on with instructional television until its commercial phone service was improved (see page 3). In 1976, however, as satellite earth stations and medical and public phones were installed in over 100 communities, the state's attention again turned to television. Based on a presumed but unstated public demand for television, legislators approved a $2.1 million addition to the earth station network for the Satellite Television Demonstration Project, a project designed to test the technical feasibility of using small earth stations for rural TV broadcast reception. The State of Alaska paid for the transponder and met the related expenses of delivering live news, sports, and public affairs programs to the seven existing commercial TV stations and of delivering eight hours of entertainment network fare a night to 23 villages, none of which had previously had access to television or a school.

One pride of the ATS-6 project had been its Consumer Committees, representative groups of site-village residents who participated in programming and production decisions. The state sought assistance from the Alaska Federation of Natives in selecting the village TV sites and the programs to be aired. This new committee consisted of representatives from each of the 12 non-profit Native regional associations. Committee members selected all village entertainment programming from all four national networks, using the villagers' expressed preferences as a basis for making decisions. Unused transponder time was offered at no cost to other state agencies to broadcast non-commercial programs of their choice to these selected village sites.

Alaskan education was undergoing significant changes when the opportunity to participate in the state's Satellite Television Demonstration Project was first proposed. In July 1976, all previously state-operated schools in rural Alaska were turned over to local control. State funding continued, but 21 Rural Educational Attendance Areas were formed, all with locally elected school boards determining how the districts would be managed and what would be taught in the schools.

The public schools reached by the Satellite TV Demonstration Project were distributed within 13 independent school districts, most of which were the newly formed districts, in three time zones. Most of these districts faced basic problems besides those of communication. In one Ohio-sized district with 300 kids scattered in eight village schools, the crisis list resembled those of neighboring rural districts: formal notice had just been received that one village high school building had failed to meet safety codes and would need either major repair or replacement; one two-room school was in danger of freezing up for the protracted winter season because fuel hadn't been delivered; and one of the three teachers in the school just downriver had quit because the only available housing was small, cold, and uncomfortable.

What the satellite instructional television project had to offer the overworked administrators and isolated teachers was a classroom resource from which they could select relevant and needed learning lessons. Labeled a "demonstration," in many respects the project signaled the end of Alaska's experiments with communications technology. This project leased satellite time from the private sector, thus setting management and operations precedents for continuing permanent Alaskan TV delivery via satellite. It represented the [illegible] opportunity to develop realistic and cost-effective instructional TV service to benefit rural education, and the Department of Education accepted management responsibility.

Alaska has no statewide curriculum, so the Department's first task was to provide instructional TV programming accountable to the varying needs of the independent district sites. Each district was first requested to state in writing its desire to participate and its objectives. With these statements and teachers' preview recommendations in mind, project staff began broadcasting 10 hours a week in early 1977.

Evaluation efforts revealed the limitations of a one-way broadcast schedule; the importance of equipment reliability; the lack of teacher experience in working with ITV; and the need to offer more variety at more grade levels to support courses in math, science, reading, social studies, and especially in Alaska studies. On the other hand, 100 percent of the teachers responding in writing wanted the ITV programs to continue the following school year, as did the parents and the students.

Additional Department of Education funding allowed expansion of the broadcast schedule to 15, then 21, hours a week during the 1977-78 school year. College credit academic courses received some response from village adults, but the most successful adult educational series was GED BY TV. Far exceeding expectation, a total of 114 rural adults enrolled in this TV course (made in Kentucky but supplemented by three Alaskan-produced segments).

The Department of Education received its first direct, substantial funding to continue this ITV service in July of 1978, in conjunction with the $2.7 million extension of the satellite network to 11 more communities. By June 1979, this network extension will allow the potential for ITV broadcasts to reach 35 percent of students enrolled in public school in Alaska.

The management lessons learned [illegible] in Alaska may well apply elsewhere. In fact, some of the problems encountered were readily anticipated from accounts of experiences of other developing educational telecommunications systems.

1. *Strategy.* We must deal with the decision-making process as it exists (and differs) in numerous Alaska government agencies, and the historical relationships, territories, and boundaries of each. A basic understanding of the terrain is necessary to determine who has what interest in creating an effective telecommunications system for education and where the different interest groups fit into the decision-making process. We must clearly address the unique needs of each of these groups, offer solutions at a specified cost, and stimulate full interaction among the varying user groups.

2. *Vocabulary.* Technical communications terminology can intimidate or bore or confuse users. Our task is to communicate clearly to educators not how the satellite works, but how instructional television works in the classroom. With this vocabulary, emphasis does shift. Given understandable and relevant information, the user is in charge.

A related problem is determining who has information and is willing or able to distribute it and to whom. With management placing priority on dealing promptly with user requests, the credibility of technical communications services can only improve. For example, when equipment breaks down, what frustrates villagers is not knowing what's going on, how long they should expect to wait, and if anyone out there is working on the problem. They need and deserve to be kept informed.

3. *Advocacy.* Implementing anything new may mean meeting resistance to change. For example, technology may pose particular threats to education, with visions of machinery replacing teachers, etc. Advocacy requires demonstrating the quality of service available and the skills would-be users need to feel in control in their own domain. If the service is well demonstrated and if it makes work quicker or better understood at a reasonable cost, it won't be ignored for long.

Where does the Alaskan experience lead? We're still testing our own waters in Alaska, exploring the value of and the need for a variety of broadcast alternatives for education. Part of our exploration includes adapting models and systems developed in other states or countries. We may develop our own definition for television in Alaska, or we may find that the current definitions suffice.

■ *Jennifer L. Wilke, Alaska Department of Education, Juneau, Alaska. This article is adapted, with permission, from a longer report published in* Pacific Telecommunications Conference Proceedings, *D.J. Wedemeyer and David L. Jones, eds., Institute of Electrical and Electronics Engineers, Honolulu, Hawaii, 1979.*

COMMUNICATION SATELLITES AND SATELLITE DEMONSTRATIONS IN RURAL DEVELOPMENT

It may be difficult to think of communication satellites as appropriate technology for rural telephony, especially since most satellites have been designed and used as substitutes for undersea cable or terrestrial microwave on heavy-traffic international and inter-urban routes. Even though costs per circuit for the satellite (space segment) and the size and costs of ground stations have been declining rapidly in recent years, most operating experience has been with systems that are inappropriately expensive for thin-route rural communications. Nevertheless, communications satellites have several features that make them ideal for rural thin-route applications when technical specifications appropriate to those applications are selected.

The most obvious characteristic is the communication satellite's cost-insensitivity to distance. The cost of reaching the most remote community is virtually the same as that of reaching nearby communities. Moreover, communication capability can be installed in order of priority of need, independent of location: the more distant locations with greater needs and greater transportation problems can be given service first. This complete flexibility of location may be important when coordinating communication installation with the specific needs of rural development projects.

Satellite systems are likely to be more reliable, more robust, and easier to maintain than terrestrial systems — an important consideration in rural areas, especially in mountainous, jungle, or desert terrain. The space segments of satellite systems have proven themselves highly reliable, as they must be in orbital locations. The ground segments, because they are located near the human settlements they serve, are easier to maintain and repair than are the remote repeater sites much terrestrial communication relies upon. Because any station can reach any other station in the network in a single "hop" through the satellite, reliable interconnection depends solely on the two stations involved. Unlike failures in terrestrial systems that depend on a series of sequential links, the failure in any ground station is strictly local and has no negative impact on other parts of the system.

Satellites also allow a degree of capacity-related flexibility that is impossible in terrestrial systems. Ground stations can be installed to provide as little as a single voice channel of service using single channel per carrier (SCPC) equipment. Additional capacity can be added easily in those locations where demand develops. Other services, including data transmission and radio and television reception, can also be added incrementally to the same basic ground station as needed. In contrast, a terrestrial microwave system must have enough capacity at the outset at all locations to provide for the maximum end-to-end capacity required, and a terrestrial open-wire system cannot undergo major capacity expansions at any remote location unless the entire system is altered, invariably at considerable cost. Satellite systems also permit a simplex circuit to be shared at a number of locations as a common conference circuit. This costs less than obtaining the same capacity by using duplex circuits to interconnect each pair of points. In addition, this capability is easier to provide by satellite than standard telephone service.

If thin-route (SCPC) earth stations are equipped with demand assignment multiple access (DAMA) capability, then satellite capacity does not need to be dedicated to earth stations. When needed, an unused circuit can be selected from a pool of general purpose circuits. By the use of simplex conference circuits and thin-route DAMA equipment, the space segment costs for rural communication can be made quite small relative to the ground station costs and relative to all-terrestrial alternatives.

Some characteristics of present satellites make them less than ideal for rural applications, and the small scale on which demonstration projects are conducted results in unit costs of satellites used in demonstration projects being higher than they are in a later operational system. Nevertheless, the service characteristics to the end users could be provided in a way that would be virtually indistinguishable from the proposed more economical system. Most of the technology would be the same as in a later system and could continue in use as part of such a larger operational system.

Rural telecommunications demonstration projects utilizing satellites could provide useful experience for the national telecommunications entities that provide the demonstration and for the rural social-service agencies implementing programs that use the communication capability. In addition, evaluation of the social and economic consequences in the rural areas involved could provide planning agencies and policy-makers with the evidence they need to make informed decisions on future investment in communications for rural development.

Some bilateral or multilateral development agencies concerned with problems of rural development may well be persuaded to bear much of the cost of a small number of experimental or demonstration programs. Meanwhile, pending the results of such demonstration projects, no short-run decisions that will make it economically difficult to provide low-cost rural telecommunications later should be taken now.

■ *Edwin B. Parker, Institute for Communication Research, Stanford University. This article is part of a longer, more technical one, "Communication Satellites for Rural Development," which appeared in the December 1978 issue of* Telecommunication Policy. *The original article was based on a paper presented at the International Satellite Communication Seminar, Lima, Peru, May 15-19, 1978.*

Rural Communications for Social Services in Peru

The education division of the *Instituto Geofisico del Peru (IGP)* has submitted a proposal to the Agency for International Development (AID) to study and conduct experimental field demonstrations of rural social-services delivery via communications satellites and UHF/VHF radio-telephone linkages. The Department of Special Projects in the *IGP* is now developing detailed project plans for AID to use in making a final decision on funding the project; representatives of the Peruvian Ministers of Education, Health, Agriculture and INTELPeru have met to discuss such plans; and a Peruvian working group coordinated by the *IGP* is elaborating upon the proposal.

The proposed project utilizes satellite and radio terrestrial technologies for rural communication. It is a pilot demonstration aimed at evaluating the effectiveness of this combination of technologies to improve social services and its implications for the socioeconomic development of rural populations. Specifically, the objective of the project is to determine the effectiveness of the hybrid satellite-terrestrial link for communications and for provision of education and health assistance to rural populations.

The proposed project entails the installation of small low-cost earth stations at two rural sites. The utilization of the INTELSAT IV-A satellite will allow these small stations to communicate with the capital city Lima or with Iquitos, Tarapoto and Pucallpa — cities with Standard-B earth stations belonging to the Peruvian Domestic Satellite (DOMSAT) system.

Three basic references were considered in planning the project: 1) regional communication needs; 2) the existing infrastructure for delivering current programs in education, health, and agriculture; and 3) the project's compatibility with the DOMSAT system.

Communication Needs

Slightly less than half of Peru's 16 million people dwell in vast rural areas where communication services are deficient or non-existent. Among rural Peruvians, the illiteracy rate is high, the shortage of teachers notorious. There are too few schools in these areas and too few physicians to provide adequate medical assistance. A new program, *Servicio Civil de Graduandos (SECIGRA-SALUD)*, provides some more medical care, but young doctors involved in this program often must operate in a communications void.

Other communication needs are for advice and instructional materials on new farming and agriculture techniques, and for telephone communication and data-transmission links between rural areas and large cities.

Existing Infrastructure

Education. Peru's education sector consists of 10 Regional Offices, 34 Zone Offices, 800 *Núcleos Educativos Comunales (NECs)*, and a great number of *Centros Educativos*. At the first three levels, administrative, development, and coordination functions are performed. The critical link between teachers and this educational structure is the *NEC*; *NECs* are located in middle-size towns, and each has a *Centro Educativo* as an adjunct facility.

The education sector will use satellite links to provide administrative support between the Educational Zonal Offices and the network of the *Núcleos Educativos*. Similarly, it will use radio UHF/VHF circuits to complete the communication support network connecting *NECs* to the teachers at the *Centros Educativos*.

Health. The health-care sector is organized in a similar way. It consists of 10 *Regiones de Salud*, 57 *Areas Hospitalarias* with 337 hospitals, 352 *Centros de Salud*, and 1,115 *Puestos Sanitarios*. The Ministry of Health takes responsibility for providing health care to the urban poor, and to those in rural and remote areas.

Puestos Sanitarios, located in the villages and attended by nurses or graduating physicians, will be linked to health centers and hospitals that will give personal supervision and logistic support. Paramedical personnel at remote *puestos sanitarios* will be able to consult directly with hospital doctors for assistance with diagnosis and, in difficult cases, with patient management. In-service training can be provided with lectures and discussions on preventive health care and be transmitted via the system links to the staff at remote health facilities. Voice channels can be used to transmit radio programs on family planning, child care, etc.

Agriculture. With voice communication to rural communities, the Ministry of Agriculture will attempt to improve the effectiveness of its extension programs. The use of voice communication is intended to increase the flow of information between government agents and extensionists. Such a communication channel is an efficient means of transmitting market prices to farmers and word of new agricultural techniques to remote areas.

Civil Defense. The system's satellite narrow-band channels can transmit indications of seismic activity at remote and isolated areas to data-processing centers, at which the need for disaster prevention and relief measures can be assessed. Defense-related instructions and first-aid assistance can be simultaneously transmitted via parallel satellite links.

Telephone Communications. As part of this project, conventional telephone service will be provided to rural towns, which will be connected to the national network. Equipped with similar facilities, each town in the network can call any other town.

In the villages, the *Centro Educativo* and the *Posta Medica* will have a telephone or a microphone and speaker. The operator will not notice, much less be bothered by, the technical complexity of electronic and interface equipment needed to make conversation possible.

Technical Compatibility

The proposed system is designed to be technically compatible with the Peruvian DOMSAT system, which uses a quarter transponder on the INTELSAT IV-A (F-2) on a leasing basis. Two earth stations with parabolic antennas of 6 meters and low noise amplifiers will be installed at two rural middle-size towns. The stations make possible voice communication with any of the Standard-B stations of the DOMSAT system, which have single channel per carrier (SCPC) FM equipment for voice-activated telephone channels. The access units at rural stations are also SCPC/FM units.

Via radio UHF/VHF circuits, surrounding villages can communicate with the middle-size town in which the small earth station is installed. Electronic wiring at the stations will connect the terrestrial and space circuits, and an operator at each station will demand-assign the voice channels in the satellite. The 12 voice channels in the space segment will be attended within the DOMSAT quarter of transponder. Multiparty conference circuits, with many subscribers sharing a common frequency channel for a simplex audio, will be part of the system. The INTELSAT space segment will also have capacity available for experimentation. The use of this hybrid system will be tailored to reflect the requirements of the participant sectors.

Benefits

The proposed Peruvian project, the first in the series of studies and demonstrations AID plans to carry out in collaboration with INTELSAT, will be of use to those undertaking similar projects in developing countries in the future. The message transmitted via the satellite-radio link will be prepared and distributed by the users — the Ministries of Education, Health, and Agriculture. These institutions will have opportunity in both participation and evaluation to improve their organization and the effectiveness of their messages. The project will generate new knowledge of program production and new evaluation methodologies.

The *IGP* in particular will gain knowledge in the use of small and low-cost earth stations and of the techno-economic implications of the technology used in the project. It will thus be in a position to help other Peruvian agencies plan satellite technology applications for rural communications and social services. (INTELPeru will also have the opportunity to experiment with small earth stations and to measure the incentives for providing social services as a new market in the telephone and data transmission service.)

More generally, the study proposed as part of this project will help policy-makers assess communication systems planning and make informed judgments on the future applications of satellite domestic systems for communications and social-service delivery in Peru.

■ *Dr. Angel Vallejos, Education Sector, Instituto Geofisico del Peru*

The Pitfalls of Satellite Projects

Alaska is in its third year of leasing a satellite for interstate and intrastate delivery of television. The cities and towns of Alaska get live and same-day (delayed) television from commercial networks on the east and west coasts, and a number of villages get daytime instructional television in the classroom plus a "prime time" entertainment schedule in the evening. State government has insisted that the long lines carrier use satellite to deliver telephone service to rural areas and has proved that an inexpensive, 15-foot (4.5 meter) dish is adequate for receiving TV.

At the same time that such "miracles" are an everyday reality, WATS, broadcast-quality audio circuits, and other less sophisticated telecommunications tools are not available at reasonable cost to Alaskans. State subsidies have enabled us to accomplish the most difficult tasks first, even though the less glamorous services are equally necessary and may prove more cost-efficient.

How we got to this point is a long, undocumented story. But in the last ten years, each of a number of projects, experiments, and demonstrations has contributed undefined elements of interest, knowledge, and experience. Those projects have ranged from simple two-way radio via the ATS-1 satellite to complex two-way video via ATS-6 and RCA's Satcom satellites. Along the way, a number of "pitfalls" have become apparent, two of which are *the tyranny of the technocrats* and *the fear of failure*.

The tyranny of the technocrats creates a situation in which the technology tail wags the communications dog. Imagine you have a social problem you suspect could be eliminated by some form of communication from point A to point B, and sitting across the table is an engineer who is supposed to help you solve it. Ostensibly, the engineer has the easiest part of the job because he works with inanimate objects that he can manipulate until they perform properly. You've got the worst of it because you're concerned about human beings and what they will or won't respond to. Good at dealing with the natural laws of physics, he tends to be disdainful or incompetent when it comes to the natural laws of human behavior and communications patterns.

Start with the opinion that a satellite is nothing more than a tool. It may be complex, it may be costly, it may seem mysterious, but understanding it well enough to use it is not difficult if you find yourself a "good" engineer to explain what you want to know. How can you find such an engineer? What you're looking for is a wizard, kindly and helpful, what you're trying to avoid is tyranny. The tyrants have no interest in what you're trying to accomplish. Since they speak a specialized language (jargon is the kindest label), they can and will baffle you. The worst of these love their toys and delight in their assumed superiority since they know all about the "air waves." (Just remember, you too could have been an engineer had you chosen to.) The best engineers, however, are indispensable, capable of making steel, aluminum, and objects painted with special alloys do things that enable you to communicate over long distances with ease. They believe the point is helping people, and to them there are no technical impossibilities or dumb questions. There may be cost considerations that put certain technical capabilities out of your reach and there may be questions that are naive, but they can and should be discussed. If you are willing to be educated about technology, you can probably find a "good" engineer, or someone who can teach you as much as you need to know. The best "indispensable technician-wizard" I know says things like "I sometimes have difficulty answering a question because there are so many possible answers." After years of dealing with him, I trust his judgment because he explains how he reached his conclusion.

The "lessons" that you (and the "good" engineer) learn from every project must, above all, influence the evolution of an operating system. This point relates directly to another pitfall of satellite use, the fear of failure.

Fear of failure on the part of the entity responsible for policy decisions at the highest level makes the entity back off from the possibility that it is beginning to build an operational system. "The first day of the rest of your life," today could also be the first day of an operating system, if you accept the principle that experimenting, demonstrating, and operating a telecommunications system are processes that will never be totally completed.

People offering you an opportunity to "revolutionize your ability to communicate" naturally want you to participate wholeheartedly so that the project will be as successful as possible. Yet, you naturally don't want to spend precious time and energy during the finite period of the project and wind up X months later frustrated because you can't afford to buy the system you've been using at special reduced rates. Cheer up and try to demystify what's happening. Indeed, planning simply involves the repetition of a number of ordered steps:

1. identifying a set of needs;
2. proposing a system including the technology, the programming, the institutional arrangements;
3. trying out the system;
4. evaluating what worked and what didn't;
5. proposing a modification of the system based on better understanding of the needs;
6. trying out the modified system; etc.

If you repeat the cycle enough times and perform each part well, eventually you will have an operating system. And, if your public policy reflects a commitment to that system, you will remember to review periodically what you have got and to decide whether increasing its capabilities to address other problems or serve additional segments of your population is desirable.

What often happens in large projects, especially expensive ones like satellite television, is that the technology is designed before the experimenters are selected. Some compelling reasons stand behind this order of things, but if two-way video is being proposed and your real need is to experiment on a more limited scale with one-way audio or two-way audio, you are presented with dilemma.

It isn't easy to turn down a large project, especially if the lion's share of the cost is being underwritten by someone else. But if you are being asked to start with step 2 or even step 3 — "trying out the system" — at least insist on being allowed to go back to step 1. Spend some effort identifying which of your development needs might appropriately be tackled using whatever medium is being offered.

Another problem you may encounter involves choosing the number and locations of sites. In Alaska, out of fairness, both federally and state-funded projects have usually included sites all over the state. But if the society in question is multicultural, or if programming is bilingual, writers and producers are pressed to serve a variety of sites adequately. Eskimo and Indian cultures may appear to white people to be more alike than different, and perhaps they are more like each other than like suburban American culture. But labeling them both Native and assuming that the same subject will interest both equally has proved invalid. Even now, when the Alaska Public Radio Network serves eleven public radio stations statewide, listeners in different regions prefer different programs.

So, regardless of what's being proposed, try to look at the project in terms of the likelihood it will teach you something you want to know. As much as possible, insist that it be tailored to fit your clients' needs. If necessary, point out another type of project that appears to you to be more profitable. Start writing a counterproposal of your own, specifying what you need to be working with, and begin to look for those agencies that will be receptive to your needs.

Should you find yourself participating in a project that only confirms your worst fears of failure, remember that even disasters can teach us something. Don't throw out the baby with the bath water. The real tragedy occurs when you go through the motions, but don't see what's there to be learned. The temptation is to remove yourself from the whole effort to escape the taint of failure. But many projects fall short of their goals, and often the subtle lessons are ignored because of this desire to flee disaster. Instead, learn what you can in the belief that you will apply what you learn later, when you continue your efforts to establish an operating system.

■ *Theda S. Pittman, Executive Director, Alaska Public Radio Network, Anchorage*

a primer on things to come: space information stations

The future of satellite communications will involve the utilization of "space information stations," which will both greatly expand the variety and capability of space communication services and reduce the associated costs. Understanding what a space information station is and how it will be able to produce these accomplishments is thus desirable for those planning communication systems for developing nations.

Communication of Information. At present most space applications involve the gathering, processing, transmission, and dissemination of information. Existing applications range from the relay of telecommunication signals for telephony, radio, television, and data to the collection and dissemination of earth, ocean, or meteorological information observed or "sensed" from the remote vantage point of an artificial satellite in space. Space information stations will be heirs to the satellites that now perform these and similar application functions.

Geostationary Orbit. The geostationary orbit, an equatorial orbit that remains fixed or stationary relative to any point on the earth's surface, has proved ideal for communications satellites. Using it, there is no need to track the satellite from the earth's surface when aiming an antenna at the satellite in order to transmit or receive signals. In other words, since the satellite position is fixed, the ground-based antenna need only be aimed once in order to provide continued radio contact with the satellite.

Not all information-related satellites utilize the geostationary orbit. At least one communications satellite system, the Molinya System developed by the Soviet Union, utilizes an elliptical orbit around the earth. Other information-related satellites, some meteorological satellites and ocean-sensing satellites among them, also utilize non-geostationary orbits. But, though various types of orbits are used for information-related satellites, most plans for space information stations require placement of such structures in geostationary orbit. With the help of remotely located sensors, such structures could gather and relay information that requires utilization of non-geostationary orbits.

Large Space Structures. "Large space structures" are facilities constructed in outer space from equipment and materials inserted into orbit. Conventional space satellites, which are much smaller pieces of equipment than large space structures, are launched into space as one completed unit; although some may have deployable antennas, solar panels, and other equipment that must be extended, they do not require actual construction in space.

The realization that space information stations of the future will be "large space structures" has led many to use these two terms as synonymous and interchangeable. Strictly speaking, though, they are not synonymous because the term "large space structure" refers to the size of the facility and the mode of construction, whereas the term "space information station" denotes purpose.

Geostationary Platform. Plans and designs for space information stations take a variety of forms, one of the most promising and illustrative of which is that for a geostationary platform. Designed at the National Aeronautics and Space Administration's (NASA's) George C. Marshall Space Flight Center, the geostationary platform would be approximately 62 meters by 31 meters and would weigh around 18,000 pounds. Main features include power modules with solar arrays at either end of the station; attitude control equipment; an assortment of "payloads" or modules (such as smaller antennas operating at various frequencies and providing various types of information services); and electronic switching equipment required to interconnect antennas to each other and to other platform support equipment. The most prominent feature of the platform design is a large 30-meter antenna; no object now in space has an antenna this big. The 30-meter parabolic antenna would operate at the "C-Band," which is the frequency band that most commercial communication satellites utilize today. Its antenna would provide 40 "spot beams" that would provide coverage to the major metropolitan areas of the region beneath the platform's location in geostationary orbit.

As envisioned, the geostationary platform contains one electronic module for each mission. (Except for design and size, the module would not differ greatly from electronic packages of equipment serving today's single-mission satellites.) A typical module for a communications mission would consist of transponders connected to antenna systems servicing the mission. The transponders would operate at the appropriate frequencies and bandwidths and would be composed of such elements as low noise receivers, frequency-conversion equipment, intermediate and high-power output amplifiers, filters, and multiplexes. In addition, because the platform can accommodate heavy and bulky equipment, modules could also include complex processors to perform signal processing and interconnect or "cross-strap" communication links from different missions.

Advantages to Developing Nations

Space information stations make the most of limited spectrum resources, can be produced to take advantage of economies of scale, and offer capabilities that existing satellite systems don't possess.

Conservation of Resources. Since satellites that operate in the same radio frequency band must be far enough apart to allow a ground-based antenna to be aimed at one without interfering with the others, the number of satellites that can be placed in geostationary orbit is finite. However, the capacity of the available frequency resources can be expanded if antennas larger than those on today's satellites are used. For example, using multiple spot beams, which illuminate limited geographical areas, or "footprints," on earth makes it possible to reuse the same frequency spectrum (as long as the footprints don't overlap). If the platform is available the potential for expanding traffic capacity is great because, as a NASA official says, "the size of spot beam footprint is inversely proportional to the size of the spacecraft antenna."

The combination of increased communication capacity and spectrum conservation holds special promise for developing nations since it helps assure future availability of space communications that proliferating single-purpose satellites might otherwise use up.

Economies. Other, technological advantages of space information stations could reduce service rates and equipment costs for users. Economies of scale associated with the use of large space structures, say representatives of Comsat Laboratories, fall into three categories: "launching, those involved with placing one large spacecraft in orbit rather than several small ones; spacecraft, those involved in constructing and operating a single, large platform with many missions rather than many separate satellites; and interconnections, those involved in interconnections on the spacecraft and among space information stations."

The size and complexity of ground-terminal equipment could also be reduced if space information stations become the mainstay of celestial communication. Significant reductions have already taken place since 1965, and the trend toward using small earth terminals holds potential for greater equipment-cost cuts. One estimate is that a small terminal may soon cost no more than a color television receiver.

Bringing down the costs of equipment and services will help developing nations stretch the limited capital they can invest in communications systems.

Advance Services Possibilities. The variety of communication and other services offered via space information systems can increase dramatically with the advent of space information stations. Technologically possible services include fixed communications satellite service; mobile satellite communications service; broadcasting satellite service; space research, meteorology and earth observation satellite services; navigation; ship surveillance; data collection; and other public services. All can help developing nations improve education, health-care delivery, and other vital services.

■ *Delbert D. Smith, Editor,* Satellite Communications, Madison, Wisconsin

A Communicator's Checklist

1 Too often development communication planners measure the success of mass communication programs by the number of radio programs, posters, and pamphlets produced. They invest relatively little effort in determining how the messages contained in those materials are received and internalized by the intended audience. Similarly, communication researchers have frequently focused on summary evaluation, reporting on the ultimate success or failure of a campaign, rather than systematically conducting formative evaluation that might lead to more successful communication.

Communication Pretesting is a tool for reversing these unhealthy trends. This University of Chicago monograph is a comprehensive and practical guide on how to design, analyze, and use message pre-testing procedures to improve the quality of a variety of communication products. In it, radio spots, posters, pamphlets, television spots, and movies each receive separate treatment. Practical research techniques that allow even novice communication planners to conduct useful and inexpensive pretesting programs are described.

Meant for practitioners, this monograph focuses on the "how-to" of the message-design process. Information on what to measure; how large a sample to use, what questions to ask, how long a pre-test should last, and how to judge what the pre-test means is provided for each of the five media types. Sample posters, radio spots, and pamphlet covers are included, and advice is related to examples. Applicable to both industrial and non-industrial societies, the information contained here constitutes an invaluable resource to mass media practitioners around the world.

Communication Pretesting by Jane T. Bertrand is available for U.S. $3.50 from the Publications Secretary, Community and Family Study Center, University of Chicago, 1411 E. 60th Street, Chicago, Illinois 60637, USA.

■ *William Smith, Academy for Educational Development*

2 Budd Hall's monograph, *MTU NI AFYA: Tanzania's Health Campaign*, is based on the proceedings of the Mtu ni Afya (Man is Health) radio study-group campaign and on its evaluation. Hall participated in both and is not, therefore, merely an objective observer of the preparation, the conduct, or the evaluation of the program. Hall's personal involvement brings to the work an insider's touch, but at the same time it keeps him from analyzing the campaign as critically as he might have. Indeed, most of the shortcomings of the monograph betray his involvement.

Hall commends efforts to involve in Mtu Ni Afya the Party, government entities, and even voluntary services from non-Party or non-government entities. Well he might. The problem, though, is the failure to see this "community participation" within the context of Tanzanian society and its ideology of development. In short, the polity of Tanzania is particularly and perhaps even uniquely conducive to community participation. It would have been more appropriate to provide a lengthy introduction on Tanzanian society, its stage of social transformation, its principles as outlined in the Party guidelines, and its aspirations vis à vis the provision of social services. (Somewhat ironically, Hall's own *Adult Education and the Development of Socialism in Tanzania* fills this gap.)

To be fair to Hall, it must be said that his review of other countries' practices in radio programming is intended to serve as background. But are India, Ghana, Cuba, and China alike enough to make the comparison of their experiences with radio campaigns valid?

A main purpose of monographs such as Hall's is to provide models that are transferable to other countries for similar purposes. But the adopter needs, among other things, information on costs and operational procedure. The latter is treated well indeed: presentations and operations are described in detail. What is lacking is an attempt to identify total costs. A record of government and international agencies' expenditures, not to mention estimated costs of the time of campaign organizers (and perhaps of the time of the participants) and other costs not mentioned (such as those of materials) would have helped readers get their bearings. Translating benefits into monetary terms is difficult, but the picture would be clearer if the discussion of the benefits derived from the program went beyond participation, target population, and changes in health practices to include discussion of the relationship of these factors to increased productivity. Similarly, a section on unintended outcomes — on the mistakes and practices to avoid in future — would also have been appreciated.

Despite the drawbacks outlined, Hall deserves credit for his detailed presentation of what went into program preparation and how the program was conducted. His descriptive analysis and attempts to measure the program's effects help readers gauge the transferability of the campaign inside or outside Tanzania.

Mtu Ni Afya: Tanzania's Health Campaign is available free from CDC.

■ *T.L. Maliyamkono, Senior Lecturer in Economics of Education, University of Dar es Salaam*

3 *The Role of Broadcasting in Rural Communication* resembles the notes of a serious graduate student: its plentiful ideas beg for development and order, and the shorthand in which it is written may mean more to Josef Eschenbach than to you or me. The effort is as devoid of pretense as the task is full of purpose, but Eschenbach's confusion is our loss.

The author has done his homework. Early perspective-giving chapters on recent communication history bespeak an intimacy both with the classic literature of socioeconomic development and with the masterworks of communication theory. But so much is crammed on a thumbnail that the formal effect is often that of "all thumbs." On page 14 alone, Eschenbach fixes Liebnitz's "monads" as the precursor of the "bit" in information theory without making the (metaphorical?) connection clear, sets up a peculiar dichotomy between cybernetic and hermeneutic communication in which the concept of feedback is made foreign to the first, and strings together so many abstractions that the mental environment dissolves in thin air (monads notwithstanding).

Sense may have been crucified by Eschenbach's translator. German-to-English translation is said to be fraught with problems of predication. More likely, though, Eschenbach simply pays a disciple's undue respect to the unscientific and incommunicative prose that too often finds favor among communication scientists.

At any rate, the simpler stuff — the case studies and how-to-do-it sections — reads better. It supports Eschenbach's contention that massive problems and mass audiences require nothing less than the deployment of mass media.

Precisely because organizing audiences by the klatch takes more time and other resources than the author thinks good sense warrants, fresh and better ways of using "big media" must be found. In the name of this cause, Eschenbach reviews radio-based communication projects in Zambia, Colombia, Ghana, and Indonesia, and he uses Everett Rogers' ladder model to perform a step-by-step analysis of an agricultural communication project.

Eschenbach's simple but important message deserves another treatment, one in which less is asked and more is given. This volume should not be discounted, but should be taken for the first try it is.

The Role of Broadcasting in Rural Communication can be obtained from the Friedrich-Ebert-Stiftung, Koelner Strasse 149, 5300 Bonn-Bad Godesberg, Federal Republic of Germany. ■ *K.C.*

Development Communication Report, published quarterly by the Clearinghouse on Development Communication, is distributed free to over 7,000 development professionals.

A center for materials and information on important applications of communication technology to development problems, the Clearinghouse is operated by the Academy for Educational Development, a nonprofit planning organization, and supported by the Development Support Bureau of the U.S. Agency for International Development as part of its program in educational technology and development communication.

The views expressed in Development Communication Report are those of the authors and not necessarily those of its sponsors. Original material in the Report may be reproduced without prior permission provided that full credit is given and that two copies of the reprint are sent to the editor.

Readers are invited to submit typed manuscripts of no more than 1,800 words and to send in photographs.

Film in Development Education

Film has been used throughout the developing world in combination with various media and in conjunction with efforts to solve basic economic and social problems. It has been used with mixed results both to transmit information and to motivate viewers to accept or adopt new practices. Occasionally the sole purveyor of messages but far more often one of a cluster of media employed to further development objectives, film has figured in attempts to boost agricultural productivity, to chip away resistance to family planning, to promote literacy, to train teachers, to dispense practical advice on nutrition and other health practices, and to promote the well-being of the target audience in a host of other ways.

Whatever the educational aim of development films, certain general considerations regarding their production, message, distribution, and testing appear to be universally relevant.

Production Concerns. A review of film use in countries of the developing world shows that there is real concern that production of any and all films be local. The long-time presence of foreign filmmakers, particularly in Africa, is perceived as detrimental to both the development of capable technicians and the positive cultural self-perception of individual societies. Consequently, resistance to western production priorities and values is strong.

Film production, however, is expensive, and the level of technical expertise needed to produce film is relatively sophisticated. A less developed country, therefore, must make substantial investments in equipment and training to produce films adequate to its project-support needs, and it may require outside technical help. Indeed, the success with which the planner's production decisions are implemented often depends on technicians — the laboratory or maintenance workers, not directors or cameramen (since the developing world has many skilled practitioners). A way out of this bind is for a number of government ministries to share production costs.

Considerable diversity of opinion characterizes the debate over whether a film for development should be made in black and white or the more costly color. Jean Rouch, French cinematographer of the African scene, maintains that black and white images may be perceived as abstractions. A compromise opinion holds that when a development film deals, for example, with an agricultural subject, the variation of color between a healthy and a diseased plant is crucial to understanding, but that a film on, say, cattle-dipping does not require color treatment.

Andreas Fuglesang, among others, has studied the kinds of visual imagery best suited to message dissemination. He found that animation is less effective than "real" images and that distracting activities in the background or additional visual images are best eliminated either by filming with a neutral or with an out-of-focus background.

"Sound" options for development films when produced for a newly or barely literate (film) audience are also numerous. Should the film be silent with no commentary or should it be silent with commentary provided on the spot by the extension worker or van projectionist who presumably understands the local needs? Should there be an "international" sound track of only sounds and music, again with comments provided with the projection? Should there be a voice-over narrator who explains in the local language what is being shown or should the film be shot in dialogue in which the action is explained by the "actors"? The most positive response, most observers concur, has been to those films that use dialogue in the local language.

Message Planning. Of concern to producers of educational films is whether their message will be received by the rural audience that is not versed in the "language" of film. In general, audiences quickly adapt to the medium, increasing their powers of observation and comprehension as their experience grows.

Without exception, film experts state that any film made for educational purposes must be carefully planned to make sure it is suited to its audience and that it addresses local needs and sensitivities. The message must be highly specific and the more local the cultural context, the more successful the communication.

Extension workers have observed that viewers will pay close attention to a film's message when they are experiencing the problem depicted in the film. A community experiencing an outbreak of diarrhea will, in other words, heed suggestions to boil water if the film establishes a connection between unboiled water and diarrhea.

The cost of producing one film for each problem, however, may be prohibitive and may tempt producers to make films that have broader messages but that have only marginal impact on audiences. Another common failing is putting too much information into a single film. The result, "information indigestion," limits the effectiveness of the information transmitted, and makes extensive follow-up instruction by an extension worker necessary.

A solution worked out in one instance was to produce films that contained a series of "single concept filmlets." By combining very short demonstration filmlets (how to) testimony filmlets (personal reinforcements), interview filmlets (why and how), and educational entertainment filmlets (a song or short play) all on the same subject, the producers made 15- to-20 minute films that provide strong support for specific recommended practices. The filmlets can be recombined to suit various audiences and situations.

Distribution. Distribution in countries where transportation systems are unreliable is as important an element as production. In the developing world the usual means for reaching rural communities with film is the mobile van. Both commercial and government film vans ply remote rural regions of Africa, Asia, and Latin America. Following a pre-arranged itinerary, a two-person van carries film, a screen, a projector, and a generator from community to community. Major problems with the use of vans, however, are maintenance and repair. The high initial costs of equipping a van, as well as the difficulties and expense of maintenance, mean that only a carefully trained support staff can keep the vans from falling idle or being used for general transportation purposes. In all, the efficient use of mobile vans requires a network of passable roads, maintenance and repair facilities, an extension service to plan, coordinate, and follow up showings, the firm resolve to adhere closely to the van's schedule in order to maintain trust and interest, and announcements over both radio and its own public address system of a van's film presentation. Additionally, when a film is shown, field workers, extensionists, or educators should be on hand to introduce it and to conduct discussions after the viewing. If more than one film is shown, the topic of each should reinforce the other.

In urban areas, educational films can be shown by special arrangement in commercial movie houses as short features or at social-service centers and schools. Typically, for example, films on breastfeeding are run at health clinics.

Testing. Once the film's message has been determined, the message must be pre-tested to ascertain its effectiveness. Post-tests of an Indian campaign in which agricultural messages were conveyed by a variety of communications media showed that some of the problems that impeded farmers' comprehension might have been avoided. Through planning and pre-testing, message designers could have assessed local knowledge levels and could have discovered which graphics did not communicate, and which messages were too complex to be absorbed.

Pre-testing films presents special problems since the message unit cannot be adequately tested until a film is complete and the costs of changing a completed film are prohibitive. From the 1974 Uppsala workshop on filmmaking in developing countries comes the suggestion that an inexpensive Super-8 film on the desired theme might be used for the trial runs of message testing (as might reusable videotape or inexpensive filmstrips).

The main question, of course, for filmmakers and governments alike is whether the filmed message is coming across. Film researchers have yet to come up with the ideal way to use film as a communication medium, but they continue to try and they now have some direction. In filmmaker David Gillrow's words, "We'd best be sure to ask someone if we're doing things right — and the best way is through pre-testing with the target audience, evaluation, and research."

A bibliography on film and development education is available from the author.

Judy Brace, CDC

VIDEO — AN APPROPRIATE TECHNOLOGY?

Issue 25 of Development Communication Report *contained a series of articles on the potential and applications of video in development projects. Here, video's most level-headed lobbyist, Peter Lewis, pitches his thoughts into the fray.*

What are the conditions under which video is an appropriate technology in development? This question (among others) has occupied the small team engaged in the UNESCO-funded inquiry "Appropriate Technology in Communication" (reported in *DCR* No. 24). The evidence culled from the correspondence and published material that has come to ATC seems at first sight contradictory. But discussion at a recent seminar on participatory communication held in Quito by CIESPAL and that conducted in the pages of *Educational Broadcasting International* over the last year can serve to set the tone, if not the limits, of the ongoing debate.

Caroline Heller's criticism of video is based on developed-country experience and in particular relies on two studies of French experience (Council of Europe: "New Media on Social-Cultural Development" and "Video: a New Information System?"). Video practitioners in Britain have challenged her conclusions, but both in England (where a massive expansion of local radio is planned) and in North America, media groups have shifted their attention from video to radio in the last five years. Radio is seen as cheaper and as more accessible and easier for nonprofessionals to master than video. This shift of interest in Western countries may not relate directly to video's future in the Third World. But the "Fogo Process" developed in Newfoundland under the Canadian National Film Board's Challenge for Change program definitely influenced Third World video use, and in the future the nonprofessional use of local radio and audiocassette technology may prove similarly influential.

CEPAC, FAO's project in Peru (as reported by Colin Fraser in *DCR* No. 23), seems to be one of video's successes in the Third World. In contrast, video use was discontinued or rejected in Tanzania and Botswana. Whatever the public or underlying reasons for the discontinuation of "Tanzania Year 16," the project does not compare with mass radio campaigns developed later with such success.

Ross Kidd's arguments for rejection of video in Botswana also deserve consideration. Video was adopted by the University of Botswana's Department of Extra Mural Studies in 1974 but was replaced by participatory theater after two years as an instrument of mass rural education. According to Kidd, his equipment was vulnerable to "bumps, dust, and other conditions difficult to avoid in rural areas." Preoccupation with video, says Kidd, inhibited the use of simpler media such as slides or audio-cassettes or drama. In participatory theater, anyone can join in, play a role, improvise dialogue, handle puppets. The genre is familiar, though careful preparation is needed in workshops for the trainers and group leaders. Comparing *Laedza Batanani* with the Freirean use of slides to assist in "codification," Kidd notes that drama, which can be produced locally, is a more effective medium than slides (which in Brazil in Freire's project had to be produced in the city). That the nearest servicing for the video equipment used in the rural Botswana project was Johannesburg, 300 miles away, may have influenced the decision to discontinue use of video. At the same time, exploiting dance, drama, and other local cultural forms makes obvious sense.

In Peru, CEPAC has not found the same technical difficulties with video. Maintenance, repair, and modification services are available in Lima as part of the project. Equipment has withstood many hours of use and transportation over rough territory. For CEPAC, video provides the means of reaching a *campesino* clientele, 80 percent of whom are illiterate. The course contents are pre-tested in the field and owe much to the participation of the 40,000 *campesinos* reached annually by the scheme.

The difference between what happened in Peru and what happened in Botswana needs to be put into perspective. Naturally, the differing geographical and cultural conditions account for much. But testing each case against some of the conclusions of the CIESPAL seminar, at which Manual Calvelo of CEPAC (who contributed to *DCR* No. 25) made an influential contribution, suggests that the two responses have more in common than appears at first blush. "A participatory communication project ought to be a response to the expressed requirements or underlying needs of participants. . . . If the project is initiated with outside help, this should assist in 'take-off' but should not generate dependency of any sort (economic, ideological, technological, cultural, etc.). The project should be integrated with and not damage the cultural values of the community. It is necessary to respect and make use of the traditional techniques of communication that can best respond to the cultural characteristics of diverse groups. Whatever equipment is chosen ought to be easy to handle and maintain, with the purpose of limiting the dependency of the participants on specialists and making training easy."

These conclusions, reached by Latin American theorists and practitioners, show as much respect as Ross Kidd does for local cultural values on the one hand and, on the other, the danger of technological dependency.

■ *Peter Lewis, Appropriate Technology in Communications, London*

On File at ERIC

Reports recently entered in the Educational Resources Information Center (ERIC) files focus on library networks and education in Africa.

- *Meeting of Experts on Planning Documentation and Library Networks in Africa (NATIS).* Paris: UNESCO, 1976. 11p. (ED 156-220).

  A meeting was held in Brazzaville, People's Republic of Congo, from 5-10 July 1976, to examine recent efforts made by African Member States to plan and develop their national information systems, and to make recommendations for the creation of networks of documentation and library services adapted to the needs of African users. This document summarizes the meeting under the following headings: Introduction, Participants, Opening of the Session, Election of the Bureau, Agenda, Summary of the Discussions, and Summary of the Recommendations. An appendix includes lists of participants and cooperating organizations. Available from EDRS in microfiche for $.83.
- Dean, John. *A Regional Library Science Program for Eastern Africa: A Report.* New York: Ford Foundation, 1974. 68p. (ED 156 114).

  The Standing Conference of African University Librarians commissioned a study to investigate the feasibility of establishing a regional library science program for its 12 English-speaking member countries. Areas to be explored included regional manpower needs, the willingness of each country's employing authorities to send students to such a school and hire the graduates; the best location for the program; curriculum structure and research; staffing policy; and timing and implementation of proposals. An assessment of each country's economic, technological, educational, and library environment and ability to host a regional program revealed that about 670 professional posts would be available between 1975 and 1980, and that demand for professional personnel was high, especially at the managerial and specialist levels. The recommended location was the University of Nairobi in Kenya. The university's basic functions would be to supply qualified personnel in response to demand, act as a center for creative thinking and problem solving, disseminate ideas of local relevance, and exercise professional leadership. Available from EDRS in microfiche for $.83 or in photocopy for $3.50.

Documents available from EDRS can be ordered from ERIC Document Reproduction Service, P.O. Box 190, Arlington, VA 22210, USA. Order by ED number and enclose payment for the price listed plus postage.

■ *Barbara B. Minor, Publications Coordinator, ERIC Clearinghouse on Information Resources*

PROJECTS IN BRIEF

These project descriptions were written by Barbara O'Grady of the Academy for Educational Development using information submitted by readers in response to the Project Information Request in issue 18 of DCR. Future newsletters will contain four project descriptions an issue until the series is completed.

THE ECOLOGY OF MALNUTRITION IN SANDY BAY, NICARAGUA

Mary Ruth Horner
Department of Nutritional Sciences
1300 Linden Drive
University of Wisconsin
Madison, Wisconsin 53706

Date submitted to CDC: December 12, 1978

FOCUS: The purpose of this nutrition-education project for women in 10 rural Miskito Indian villages of northeastern Nicaragua was to eliminate poor child-care practices, especially those associated with diarrhea, intestinal parasites, and bottle feeding; to teach the importance of a balanced diet for children; and to identify problems associated with family gardens. Lesson topics and formats were varied and included taped cassette messages, discussions of the messages and of photos and water-color drawings used as illustrations of major points, and demonstrations by local village leaders and the participants themselves.

SUBJECT AREAS: Agriculture, Health, Nutrition

TYPE OF MEDIA: Cassette recorder, photographs, water color drawings

TARGET AUDIENCE: Illiterate rural women

SCALE OF PROJECT: 10 villages

PROJECT STATUS: Begun in 1976; project report in publication stage as of 12/78

SPONSORING/COOP. AGENCY: Midwest Universities Consortium for International Activities; Department of Nutritional Sciences (University of Wisconsin-Madison); Nicaragua Health & Nutrition Program (Puerto Cabezas); Ministry of Health (Nicaragua)

PROYECTO DESARROLLO DE QUICHÉ

Mark D. Walker
Proyecto Desarrollo Rural — CEMEC
19 Calle, 13-33 Zona 10
Ciudad Guatemala, Guatemala

Date submitted to CDC: February 25, 1978

FOCUS: CEMEC is a Guatemalan development agency that focuses on improving living conditions in the highlands of Guatemala. At a small experimental farm, it sponsors projects intended to increase agricultural production and income. It also runs a health-nutrition center in San Andres, Sajcabaja, and an audiovisual educational program aimed at improving the self-image and initiative of the local population through the expressive arts (e.g., dance).

SUBJECT AREAS: Agriculture, Health, Nutrition, Community Development, Education

TYPE OF MEDIA: Cassette recorder, videotape, 16 mm film, filmstrips, slides, photographs, books, pamphlets

TARGET AUDIENCE: Illiterate rural adults and youth

SCALE OF PROJECT: Regional — 12 villages

PROJECT STATUS: In implementation stage as of 2/79

SPONSORING/COOP. AGENCY: World Vision, Norwegian Church Relief, Church World Services, AID, Ministries of Education, Health, and Agriculture, CIDA, Heifer Project

NATURAL FAMILY PLANNING

British Life Assurance Trust Centre For
Health and Medical Education
BMA House
Tavistock Square
London WC1H 9JP ENGLAND

Date submitted to CDC: October 18, 1977

FOCUS: A simple, basic, teaching and learning package has been developed for training teachers and for teaching methods of natural family planning. The training package will be tested in six locations and three languages in both rural and urban developed and developing countries. The audience ranges from university graduates to illiterates. The major problem has been to develop a package flexible enough to deal with these locations and audiences.

SUBJECT AREAS: Family Planning

TYPE OF MEDIA: Flipcharts with transparent overlays

TARGET AUDIENCE: Literate and illiterate adults and youth, both rural and urban

SCALE OF PROJECT: Begun in 1976; in evaluation stage as of 10/77

SPONSORING/COOP. AGENCY: World Health Organization; B.L.A.T. Centre for Health and Medical Education (London)

RADIO EDUCATION TEACHER TRAINING PROJECT

Burton C. Newbry
HRD
USAID/Nepal
Kathmandu, Nepal

Date submitted to CDC: January 3, 1979

FOCUS: This nationwide program focuses on training rural primary teachers in Nepal through radio and printed support materials. The project is now in the developmental phase, during which time materials are being developed and tested, personnel trained, support mechanisms perfected, and equipment installed. The second phase will involve broadcasting to a test group of 100 teachers; the third, expanding the program to 1,000 teachers nationwide.

SUBJECT AREAS: Education

TYPE OF MEDIA: Radio

TARGET AUDIENCE: Literate rural adults and youth

SCALE OF PROJECT: National

PROJECT STATUS: Begun in 1977; in implementation stage as of 1/79

SPONSORING/COOP. AGENCY: HD, British Council, UNICEF

(See DCR issue 24 for details.)

Dilemmas (continued)

therefore loathe to assume new responsibilities without additional remuneration. This card house of abuses was toppled shortly before the onset of the project when this consulting system was outlawed. But those affected by the new law didn't think that the salary raises it stipulated compensated them for the loss of income from consulting; they spent office hours ferreting out loopholes and looked with disapproval upon the new project and the responsibilities it entailed. The only true interest exhibited was in conjunction with unabashed hunger for the money being pumped into the project by a foreign donor. Naturally, mercenary values compounded the ever-present problems of petty jealousy, internecine squabbling, power grabbing. That Foreman got anything accomplished, and he did, stands as a tribute to his forcefulness and popularity.

The deadlock just described was made worse by the diehard ideal of the bold autocrat. The notion of "participatory management" was new to Country X, and while it received some lip service, the old ethos lingered on. In general, the lower echelons had little say in policy-making, concern for employees' performance and personnel was nominal, and the drive toward mere perpetuation of the bureaucracy had become all-consuming. Only unusual complaint or rare rebellion brought any change, and the civil service was maintained by placation rather than by leadership or development. Foreman thus had little incentive to relinquish his role as authority figure. No one stopped him. No one thought his style shocking.

The Stroke. The collapse came when Foreman unexpectedly resigned from office following public exposure of official improprieties. He left a power vacuum, and his replacement unwisely accorded full responsibility to Secretary without according him full power. Paralysis ensued, deadlines expired, and Moneybags cut off further funds.

The Verdict and the Lessons. Like many development projects, this one died of poor planning and congenital organizational deficiencies. But much can be learned from this unfortunate death. First, donors should not give the impression that hosts are doing them a favor by permitting a project. Second, donors should not be impatient; waiting for hosts to do their homework may ultimately entail fewer problems than trying to do it for them. Third, agents and counterparts should be chosen with utmost care. Fourth, new organizations set up to carry out long-standing activities must be made compatible with existing organizations. Fifth, the support of subordinates must be cultivated with the same energy that the backing of superiors is, and the fate of a project should not be placed in the hands of any single individual.

Obvious and trivial lessons? If so, why haven't the major funding agencies and contractors learned them yet? ■

CALL FOR COPY

DCR's editor invites readers to submit manuscripts on health-education projects that use the media, the use of computer technology in communication and education in developing countries, innovative literacy efforts, and message design. Readers are also welcome to send in announcements, opposing opinions, photographs, and "recipes" for simple educational technologies.

COMMUNICATORS' Q & A

In the offing at the Clearinghouse is the production of a pocket-sized encyclopedia of prescriptions and advice. CDC plans to collect requests for information and to invite specialists to provide one- or two-page responses. To be presented in question-and-answer form, the information will cover technology choices, common organizational problems, testing and pre-testing, and other subjects specified by *DCR* readers.

Send questions or word of your willingness to reply to others' questions to *DCR*'s editor.

A MASTER OF INTERACTIVE TELECOMMUNICATIONS?

The School of the Arts at New York University will offer a program leading to a Master of Professional Studies degree in Interactive Telecommunications beginning fall 1979. Developed over the last three years with Rockefeller Foundation support, this two-year program will be the first program given at an American university in interactive telecommunications.

Dr. Martin Elton, former director of the Communication Studies Group at University College London, will head the new program. The faculty will consist of scholars, practitioners, and researchers joined by a select group of adjunct personnel from business and government. The curriculum will include courses in the characteristics of interactive media, social organization, communication behavior, the telecommunication industry, and management.

More information may be obtained from Dr. Martin C. J. Elton, Interactive Telecommunications Program, School of the Arts, New York University, 144 Bleecker Street, New York, New York 10012, U.S.A.

Cheap & Easy

LAP TEACHING BOARD

Materials needed...in inches

16 x 24 piece of cardboard
11 x 24 piece of cardboard
8 x 13 piece of cardboard
(cut up large packing box or use scrap wood)
Felt or flannel to cover the 16 x 24 piece
Masking tape (the wider the better)

INSTRUCTIONS

1. Tape felt to the 16 x 24 piece.
2. Tape the 11 x 24 piece to one end of (1.) so it will open to 60° angle.
3. Cut the 8 x 13 piece diagonally to make two equal triangles.
4. Place them in the angles of (2.) and tape together.

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Linda Lavin

L.P.A. 596 Logan Avenue, Toronto, Ontario, CANADA M4K 3B9

Dilemmas in Country X: Candid discussions about failures

This Aesopian tale of compounded errors was contributed anonymously by a closet fabulist whose wit upholds reason. It is a close, if caustic, examination of a communication project that died of diseases that were probably curable.

(The editor invites readers to submit reports for this column. Author's name — as well as those of the people, agencies, and countries involved in the projects — will be withheld upon request.)

The Death. Moneybags (an international fund-raising and disbursing body) and Contractor (an international consulting firm) on the one side, and Foreman (the civil-service head of a government subministry in Country X), on the other, agreed to undertake a rural communication project together. Foreman was to have chief responsibility, and Contractor would provide advice through an agent. Program, budget, and timetable were set. Action began. Foreman boldly and unilaterally accelerated the timetable. His gamble paid off. Despite strains and grumbles, his staff pulled through, results were encouraging, and preparations were made for the second stage. But the second stage never materialized. Disappointed, Moneybags withdrew, and all Foreman's men and Contractor's advice could not put the project together again — a failure explained in this post mortem.

The Wooing and Conception. Moneybags and a Contractor had identified a government with the kind of education policy they were seeking — even though programs and projects were few. They therefore proposed a project, which the government found to its liking.

Several factors color what happened next. First, Moneybags' local agent, M-001, was eager to get at least one project accepted before his scheduled departure from his post. Second, this project was by far the largest yet put in the Contractor's hands by Moneybags, and Contractor's agent, C-001, was on the verge of retirement and was determined to go out with a flourish. Third, Country X's government did not have expertise or infrastructure on a par with its enthusiasm.

For 15 months, during which in-country personnel were sent abroad for training, project negotiations proceeded fitfully. They dragged on because Foreman's staff members carried out procedures only when C-001 was in town to accompany them to the authorities. Moreover, friction developed because project workers felt that they deserved foreign fellowships as reward for participating in the project, and failure to conduct important business in Country X's language further slowed progress. Underlying many related difficulties was one fact: the foreign agencies seemed to attach more importance to the project than their hosts did.

Defective Planning and Implementation. Many of the pitfalls of project implementation reflected poor planning and budgeting. The clincher, though, was the devolution of some of Foreman's power to a Secretary, Foreman's "right-hand" man, who was an aspiring politician; capable enough, the appointee used the position not to oversee a project, but to launch a career. His heart was not in the project, and he had little power over his subordinates, most of whom were part-time employees. The upshot was that no one associated with the project could or would make a move without Foreman's help. No ministerial, much less inter-ministerial, project structure was ever established.

The Climate and Style of Bureaucracy. Miraculously enough, the first stage of the project was launched with encouraging success. Accelerating the schedule had freed up time for making extra preparations for stage two. But the combination of high taxes and low salaries had given rise to a system in which government employees earned much of their income by acting as paid, ad hoc consultants (sometimes even to their own ministries during working hours!), and civil servants were

(Continued on page 15)

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